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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/082,309 05/20/98 WALDER

A 15258-176-1U

EXAMINER

020350 IM22/1203
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STAICOVICI, S
ART UNIT PAPER NUMBER

1732
DATE MAILED:

12/03/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/082,309

Applicant(s)

Andreas Walder

Examiner

Stefan Stalcovici, Ph.D.

Group Art Unit

1732



☒ Responsive to communication(s) filed on Sep 20, 1999

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle* 35 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire three month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

☒ Claim(s) 16-26, 28, and 29 is/are pending in the applicat

Of the above, claim(s) _____ is/are withdrawn from consideration

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 16-26, 28, and 29 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☒ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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DETAILED ACTION

Amendment

1. Applicants' amendment filed on September 20, 1999 (Paper No.4) has been entered. Claim 16 has been amended. Claim 27 has been canceled. No new claims have been added. Claims 16-26 and 28-29 are pending in the instant application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 16-26 and 28-29 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In claim 16, line 1, the limitation "which does not use extruders" does not appear to have support in the original disclosure. Claims 17-26 and 28-29 are rejected as dependent claims.

Further, it should be noted that in claim 19, line 1, the Applicants claim a process step of "extruding the mixture after cooling", hence it is submitted that an extruder is required in order for

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an extruding process step to occur as claimed. Therefore, the subject matter in claims 19-21 is in direct contradiction with the subject matter presented in claim 16. Clarification is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 16-17, 19-23, 25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckner (US Patent No. 3,751,377) in view of Muirhead et al. (US Patent No. 3,372,215).

Buckner ('377) teaches the basic claimed process including providing a source of molten resin (31), a source of volatile fluid foaming (blowing) agent (37) and a plurality of interfacial surface generators (32, 33, 34) (static mixers) (see col. 2, lines 44-46). As shown in Figure 2, the source of molten resin, extruder (31) is in operative communication with interfacial surface generator (32) (static mixer) which provides admixing of the blowing agent with the heat plastified polymer. It should be noted that the volatile fluid foaming (blowing) agent may be added directly to the polymer source at the entry to the first interfacial surface generator (32) or may be added within the interfacial surface generator (see col., 4, lines 67-70), therefore it is submitted that the mixture of molten resin and blowing agent is acted upon by a plurality of interfacial surface generators (32, 33, 34) without the use of any extruders. Furthermore, it should be noted that in

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addition to using extruders, alternative methods are well known in the art for providing a stream of molten polymer. Therefore, it would have been a mere obvious matter of choice for one of ordinary skill in the art at the time of the invention to employ an alternative process to extrusion for providing a stream of molten polymer in the process of Buckner ('377), due to availability and its well known status in the art. As shown in Figure 2, the process line further includes processing units (33) and (34) to remove heat (cooling) from the heat plastified mixture and bring the material to a desired (predetermined) temperature prior to discharge from the die (35). However, Buckner ('377) does not teach granulating the cooled mixture. Muirhead *et al.* ('215) teach a process of forming expandable thermoplastic particles by extruding a heat plastified polymeric composition containing an expanding (blowing) agent in filamentary form, immediately cooling the extruded polymer and cutting the extruded and cooled polymer into particles (granules). It would have been obvious for one of ordinary skill in the art at the time of the invention to replace the die (35) in the process of Buckner ('377) with the die head (13), cooling bath (19) and cutter (20) of Muirhead *et al.* ('215) in order to form granulate material due to availability, process versatility and ease of processing. It should be noted that although Buckner ('377) does not directly teach "extensive shearing" while dispersing the blowing agent and "less shearing", with respect to the dispersing step, while retaining the mixture, it is notoriously well known in the art to "extensively" shear the molten resin as the blowing agent is added. Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention to "extensively" shear the molten resin as the blowing agent is added, hence in essence providing "less shearing", with respect to the dispersing step, while retaining the mixture,

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in the process of Buckner ('377) as modified by Muirhead *et al.* ('215), in order to uniformly distribute the blowing agent within the molten resin, due to availability and its well known status in the art. Furthermore, it should be noted that a static mixer inherently has a retention time which varies according to its size, hence the static mixer performs both mixing and retaining functions.

Regarding claim 17, Buckner ('377) teaches the use of interfacial surface generators (static mixers) to remove heat (cooling) from the heat plastified mixture and bring the material to a desired (predetermined) temperature prior to discharge from the die.

In regard to claims 19-21, Muirhead *et al.* ('215) teach a process of forming expandable thermoplastic particles by extruding a heat plastified polymeric composition containing an expanding (blowing) agent in filamentary form, immediately cooling the extruded polymer in a water bath and cutting (disintegration) the extruded and cooled polymeric filament into particles (granules).

Specifically regarding claim 22, Buckner ('377) teaches the use of additives with the thermoplastic melt.

Regarding claims 23 and 25, Buckner ('377) teaches that the choice of an interfacial surface generator (static mixer) is to be made with regard to the pressure drop occurring during viscous flow of the material within the flow line. Further, it is well known in the art that as material flows along a fluid transmission line a pressure drop occurs. It would have been obvious for one of ordinary skill in the art at the time of the invention to use routine experimentation to control the pressure drop throughout the flow line in the process of Buckner ('377) as modified by Muirhead *et al.* ('215) in order to control the density of the resulting product and hence improve product quality.

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In regard to claim 28, Buckner ('377) teaches that fluid foaming (blowing) agent is added directly to the polymer source at the entry to or within the first interfacial surface generator (static mixer) (32), as shown in Figure 2. Hence, dispersing of the foaming (blowing) agent occurs in a first static mixer, while retaining and cooling of the resulting mixture is subsequently performed in static mixers (33) and (34).

6. Claims 18 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckner (US Patent No. 3,751,377) in view of Muirhead *et al.* (US Patent No. 3,372,215) and in further view of Muller *et al.* (US Patent No. 4,314,606).

Buckner ('377) in view Muirhead *et al.* ('215) teach the basic claimed process as described above. However, Buckner ('377) as modified by Muirhead *et al.* ('215) do not teach cooling in a static mixer having elements crossing each other and formed as heat exchanging pipes. Muller *et al.* ('606) teach an apparatus suitable for providing any fluid media (melt, paste, dough), heat exchange (heating and cooling) and mixing, including a series of pipes (2) as shown in Figure 1. It would have been obvious for one of ordinary skill in the art at the time of the invention to use the apparatus of Muller *et al.* ('606) in the process of Buckner ('377) as modified by Muirhead *et al.* ('215) in order to reduce processing time by simultaneously mixing and cooling the extruded material, hence increasing productivity and lowering production costs.

7. Claims 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckner (US Patent No. 3,751,377) in view of Muirhead *et al.* (US Patent No. 3,372,215) and in further view of Suh (EP 0 445 847 A3).

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Buckner ('377) in view Muirhead *et al.* ('215) teach the basic claimed process as described above. However, Buckner ('377) as modified by Muirhead *et al.* ('215) do not teach selectively increasing the pressure of the melt as it travels from the dispersing stage to the retaining stage and then to the cooling stage. Suh (EP 0 445 847 A3) teaches a process whereas the pressure is monitored throughout the flow line and its drift downwards (decrease) is corrected, hence in effect increasing the pressure, by reducing the temperature (hence increasing the viscosity), closing a throttle valve located between a mixer and a die and increasing the feed rate (page 3, lines 54-58). It would have been obvious for one of ordinary skill in the art at the time of the invention to increase the pressure of the thermoplastic melt and foaming (blowing) agent composition as taught by Suh (EP 0 445 847 A3) throughout the flow line in the process of Buckner ('377) as modified by Muirhead *et al.* ('215) in order to have better process control, increase the density of the resulting product and improve process reliability.

Response to Amendment

8. Applicants' amendment filed September 20, 1999 (Paper No.4) has been fully considered.

In view of the Applicants' amendments the objections to the Specification and Drawings, and the rejections under 35 U.S.C. 112, 2nd paragraph, and 35 U.S.C. 102 have been withdrawn. However, in view of the Applicants' amendments, a new rejection under 35 U.S.C. 112, 1st paragraph has been necessitated.

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Applicants argue that the art of record does not teach or suggest, either alone or in combination, a method that does not use extruders for the production of expandable plastics granulate from a plastic melt and a fluid blowing agent. However, this argument is drawn to a newly presented claim limitation not previously presented. Accordingly, the limitation was not considered in light of the cited prior art in the First Office Action. However, the newly argued claim limitation has been rejected in this Office Action as set forth above.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Conclusion

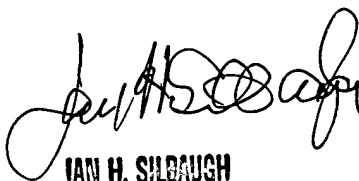
10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (703) 305-0396. The examiner can normally be reached on Monday-Friday 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jan H. Silbaugh, can be reached at (703) 308-3829. The fax phone number for this Group is (703) 305-7718.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.


JAN H. SILBAUGH
SUPERVISORY PATENT EXAMINER
ART UNIT 1732
12/02/99

November 29, 1999



Stefan Staicovici, PhD